

Sweden, Denmark, the United States, the Argentine Republic, Peru, and Brazil, signed, at Paris, the International Convention for the adoption of the metrical system of weights and measures. A special clause reserves to the States not included in the above list the right of eventually adhering to the Convention.

IT was the Hon. T. Elder (not Eden), who, with Mr. Hughes, bore the expenses of Col. Warburton's journey across Australia, the narrative of which we noticed in last week's NATURE (p. 46).

THE French Association for the Advancement of Science meets at Nantes this year, under the presidency of M. d'Eichtal, an influential banker largely connected with railway interests. The local committee is presided over by the Mayor, and a large sum has been collected for defraying the expenses connected with the meeting.

THE annual report of the trustees of the Museum of Comparative Zoology, of Cambridge, U.S., for 1874 has just been published, and contains the current history of that distinguished establishment, as also the list of the additions to its various departments. The strict economy necessary to relieve the Museum from its embarrassments, after the death of Prof. Agassiz, has effected its purpose, and its financial condition is rapidly approaching a satisfactory state.

PROF. ALEXANDER AGASSIZ announces that the experience of the past two years has shown the impossibility of conducting the Anderson School of Natural History, Penikese Island, upon the plan originally intended. The trustees find themselves at the end of the means at their disposal. To enable them to carry on the school it is proposed to charge a fee of fifty dollars for the season, and they hope that a sufficient number of pupils can be secured to warrant them in going on. Even with the proposed charges there will be a considerable deficit (as was the case last year) to be met by the friends of the Penikese School.

WE believe that M. Wallon, the French Minister of Public Instruction, is to present a law for the organisation of the higher education in France.

THE *Watford Observer* of May 22 contains reports of two papers read at the last meeting of the Watford Natural History Society: "Introductory Remarks on the Observation of Periodical Natural Phenomena," by Mr. J. Hopkinson, F.L.S., and "Notes on the Observation of Plants," by the Rev. Dr. W. M. Hind. It is gratifying to see local societies turning their attention to subjects of so much importance.

DURING the first three days of last week the Geologists' Association made an interesting excursion to Charnwood Forest, in Leicestershire. A full report of the proceedings appears in the *Leicester Chronicle* for May 22.

MESSRS. CHAPMAN AND HALL have just published a translation of F. Jagor's "Travels in the Philippines," of the German edition of which we were able to give a favourable review in vol. viii. p. 138. The translation seems to us to be well done, and the book contains a good map and many illustrations; it merits a favourable reception from the English reading public.

WE have an evidence of the activity of research in the United States in the following list of American Microscopical Societies furnished by the *American Naturalist*:—Agassiz Institute, Sacramento, California; Academy of Natural Sciences, Philadelphia, Biological and Microscopical Section; American Association for the Advancement of Science, Microscopical Section; American Microscopical Society of New York; Bailey Club, New York; Boston Microscopical Society; Boston Society of Natural History, Microscopical Section; Dartmouth Microscopical Club, Hanover, N. H.; Fairmount Microscopical Society of Philadelphia; Indiana Microscopical Society, Indianapolis, Ind.;

Kirtland Society of Natural History, Cleveland, Ohio, Microscopical Branch; Louisville Microscopical Society, Louisville, Kentucky; Maryland Academy of Sciences, Baltimore, Section of Biology and Microscopy; Memphis Microscopical Society, Memphis, Tenn.; New Jersey Microscopical Society of the City of New Brunswick, N. J.; Providence Franklin Society, Providence, N. J., Microscopical Department; San Francisco Microscopical Society; Society of Natural Sciences, Buffalo, N.Y., Microscopical Section; State Microscopical Society of Illinois, Chicago, Ill.; State Microscopical Society of Michigan, Kalamazoo, Mich.; Troy Scientific Association, Troy, N.Y., Microscopical Section; Tyndall Association, Columbus, Ohio, Microscopical Section. Eight of these societies have been established within the last two years.

WE have received the Eighth Annual Report of the Perthshire Society of Natural Science, from which we regret to see that there has been rather a falling-off in the prosperity of the Society, arising mainly from indifference on the part of the majority of its members. In this, as in most other similar societies, the work is done by but a small portion of the members. Still the Society is working well in various ways, and this report contains a long and interesting address by the President, Sir Thomas Moncrieff, on the work done by the Society during the past year. We hope the publication of this Report will be the means of rousing a larger number of the members to take an interest in the work of the Society.

THE Report for 1874, read at the thirteenth annual meeting of the West Riding Consolidated Naturalists' Society, embracing a large number of Field Clubs in the West Riding, is a very favourable one. At the time of the meeting, some months ago, the number of members was 545, and the Report states there is good reason to believe that studies in the various branches of Natural History are now diligently and earnestly pursued.

THE additions to the Zoological Society's Gardens during the past week include a Black Ape (*Cynopithecus niger*) from Celebes, presented by the Hon. Evelyn H. Ellis; a West Indian Agouti (*Dasyprocta antillensis*) from Trinidad, presented by Mr. Christopher James; a Coypu Rat (*Myopotamus coypu*) from South America, presented by Mr. Robert E. Paton; a King Penguin (*Aptenodytes pennanti*) from the Falkland Isles, presented by Mr. L. Cobb; an Indian Cobra (*Naja tripudians*), two Russell's Vipers (*Vipera russelli*), three Carpet Vipers (*Echis carinata*), an Indian Eryx (*Eryx johnii*), an Indian Python (*Python molurus*), three Indian Rat Snakes (*Ptyas mucosa*), and five Long-snouted Snakes (*Passerita mycterizans*), from India, presented by Dr. John Shortt; two Rendall's Guinea Fowls (*Numida rendalli*) from West Africa, two King Parrakets (*Aprosmictus scapulatus*) from New South Wales, deposited; a Molucca Deer (*Cervus moluccensis*), born in the Gardens.

SCIENTIFIC SERIALS

Journal of the Franklin Institute, April.—The following are the principal original papers in this number:—Report on a test trial of a Swain turbine water wheel, by J. B. Francis, C.E.—On the moments and reactions of continuous girders, by M. Merriman, C.E.—Compound and non-compound engines, steam jackets, &c., by C. E. Emery, C.E.; this is the first part of a paper presenting a discussion of the results of experiments made on several U.S. Government steamers.—First part of a paper on experiments made at the Mare Island Navy Yard, California, with different screws applied to a steam launch, to ascertain their relative propelling power, by Chief Engineer B. F. Isherwood, U.S.N.—New processes in proximate gas-analyses, by Prof. Henry Wurtz, continued from a former number.—On the cause of the light of flames, being a translation from the German of W. Stein, who discusses the results attained by Prof. Frankland.

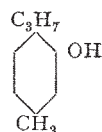
Der Naturforscher, Feb. 1875.—This valuable publication contains abstracts of many important papers published elsewhere, most of which are noticed separately in *NATURE*; but there are also numerous original papers. We point out the following:—On the elements of the flora of the Chalk period, by C. v. Ettingshausen.—On the nature of lichens, by P. Magnus. This is an account of the difference of opinion existing amongst the authorities on the subject in question, some of whom do not think lichens uniform organisms, but rather suppose them to consist of a fungus which draws the greatest part of its organic substance from the Algæ (the so-called lichen *Gonidia*) round which it grows, while others do not agree with this view; the author, however, tends to the adoption of the idea as a correct one.—On the Biela Comet shooting stars observed by Herr Winnecke at Strasburg on Dec. 3 last.—On the revival of Rotifera, by Mr. Leidy.—On the atmospheric peroxide of hydrogen, by Herr Houzeau.—On the colour and specific gravity of sea-water; observations made on board the German Expedition corvette *Gazelle* on her voyage to the Kerguelen Island, under the superintendence of Herr von Schleinitz. These observations seem to show that the blue colour of sea-water stands in close relation with the quantity of salt the water contains, and that as the salt decreases the colour passes from blue to blue-green and dark green. There seems to be such regularity in this, that simply according to the specific gravity of the water the shade of colour could be determined which the water must show, and *vice versa*. The transparency of the water seems also to increase with its quantity of salt; that of blue water was found to be 4.7 meters, while that of dark green only 2.5 meters.—On the nature and the laws of adhesion, by J. Stefan.—On the assimilation of nitric and sulphuric acids by germinating peas, by Herr Kellner.—New researches on some absorption phenomena of field-soils, by Herr Eichhorn.—On the spectra of comets, by H. C. Vogel, with special reference to Coggia's Comet.—On the copulation of spores of Algæ, by P. Magnus.—On the digestion of albumen, by R. Maly.—On a new method to investigate the nature of electric discharges, by Herr A. M. Meyer.—On a new theory of the sensation of light, by Herr E. Hering. This theory refutes that of Young and Helmholtz, which adopts three simple colours, red, green, and violet, and sometimes requires certain psychic processes for explaining certain facts. Herr Hering tries to do away with these processes in question.—On the new malleable glass, by Herr J. Fahdt.—On the decomposition of preserved wood, by Max Faulet.

Zeitschrift der Oesterreichischen Gesellschaft für Meteorologie, Feb. 15.—This number contains an article on the universal meteorograph, by Prof. Van Rysselberghe, of Ostend. The instrument was fully explained by the inventor at a recent meeting of the Meteorological Society.

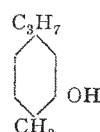
March 1.—The subject of rain and the barometric minimum is here further discussed by Prof. Reye, who finds that his views agree in the main with those of Herr Hann. Both these meteorologists recognise the latent heat of vapour as moving force in rotating storms; this causes the air to ascend and fresh air to be drawn in. According to Herr Hann, the barometer only sinks fast after a large whirl with a strong ascending current has been formed. Prof. Reye agrees with him in thinking that the rotatory movement contributes to rarefaction in the centre and thus renders possible the occasional long duration of minima. But he differs with him regarding another point. He considers that the ascending central current can only last so long as its temperature, derived from condensation, exceeds that of the surrounding air, and that this higher temperature must make pressure lower beneath the ascending current than around the cyclone. Dr. Hann, on the contrary, affirms that condensation has little effect on pressure, and that the minima of storm-centres are not caused by rainfall. Mohn's theory of the propagation of storms in the direction of largest rainfall cannot hold good if the latter view be correct. Loomis has shown how American storms generally move towards the area of greatest rainfall. Mohn finds from observations of 210 European stations that moisture is most prevalent on the front side of depressions. Thom testifies to the enormous rainfall accompanying storms in the Indian Ocean. Prof. Reye calculates that if it were possible for rain to fall to the amount of 1 mm. at any place without producing any indraught of air, the barometer would fall $\frac{1}{3}$ of a millimetre, and generally in that proportion. Now, in hurricanes, such a condition is more nearly approached than in thunderstorms or steady rains. In the vortex, air and vapour rise so rapidly that they cannot part with much heat, and at the same time the inflow of

the lower strata is retarded and the outflow of the upper strata accelerated by centrifugal force. There still remains, after liberated latent heat has been employed in expansion, a portion which has been disregarded, equivalent to the *vis viva* of the whirling mass and the work of expansion performed in ascending. With all this evidence he maintains his theory.—In the *Kleinere Mittheilungen* we have the last part of Dr. Ucke's paper on atmospheric oxygen, containing tables which give its variations in quantity at different seasons, with reference to the means of all stations together, and of the stations taken separately. At Seringapatam the difference between summer and winter is least, viz., 1 per cent.; London shows 4, Brussels 6, Vienna 8, Petersburg 9, Samara 14, and Barnaul 16 per cent. Proximity of the sea and elevation obviously produce the low figures, and the more easterly a place lies on the continent the greater are the differences between the seasons.

The *Gazzetta Chimica Italiana*, fasc. i. e. ii. 1875, contains the following original papers, besides a great number of abstracts from other serials:—On two new derivatives of phloretic acid, by W. Koerner and P. Corbetta. These are researches on methyl- and ethyl-phloretic acids and their products of oxidation. The authors arrived at the conclusion that phloretic acid can most probably be regarded as phenolisopropionic acid of the formula $C_6H_4.OH.CH \begin{cases} CH_3 \\ COOH \end{cases}$.—On the origin of the sulphides and hyposulphides found in natural sulphur waters, by Prof. E. Pollacci.—Researches on some derivatives from natural and artificial thymol, by E. Paterno. The author considers acetylic, methylic, ethylenic, and the sulpho-methylic derivatives of both thymols, and points out their differences.—On paratoluic nitride and some of its derivatives, by E. Paterno and E. Spica.—A note from Dr. M. Fileti, on a glucosate of copper.—Account of experiments made by the same author and E. Paterno, to obtain a carbo-cymenic acid. The experiments made until now with natural thymol and its artificial substitute obtained from cymene, show that both are hydroxyl derivatives of the same cymene, which upon oxidation gives paratoluic acid, and therefore contains the propyl and methyl group in the positions 1 to 4; the difference rests therefore only in the position of the hydroxyl, and as only the two following oxy-derivatives of parapropylmethylbenzine



and



were possible, it remained to be decided which of the two formulæ applied to natural and which to artificial thymol. The nature of the cresols obtained by Engelhardt and Latschinoff, and by Kekulé, by the action of phosphoric anhydride on the isomeric thymols, has rendered it very probable that the first of the above formulæ represents the natural thymol, the other the artificial one. The authors made the experiments of converting sulpho-cymenic acid into carbo-cymenic acid, which has the

following formula, $C_6H_3 \begin{cases} C_3H_7 \\ CH_3 \\ COOH \end{cases}$, and then tried to oxidise the

latter, by which they would have finally solved the above question. They have not quite succeeded yet, although they hope to publish their final results shortly.—On the supposed emission of carbonic acid from the roots of plants, by M. Mercadante and E. Colosi. The authors pretend that no such emission exists.—The remainder of the number consists entirely of summaries from other journals, most of which we have already noticed.

In the 2^e fascicule of the *Bulletin de la Société d'Anthropologie de Paris* for 1874, M. Dareste concludes his reply to M. Broca's theory of the mode of formation of double monsters, considering them under the several types named by Isidore G. Saint-Hilaire, "janiceps, iniopes, synotes," and "deradelphes." In a later meeting of the Society, M. Broca entered at great length on the consideration of the "Doctrines of Diplogenes," and endeavoured to show the untenability of the hypothesis which ascribes this abnormality to fusion rather than to excess of development, and an inherent tendency in the embryo to a repetition or doubling of parts.—A letter was read from M. Prunières, in which he describes the artificial perforations discovered by him in human skulls belonging to the period of dolmens. As early as 1868 the writer first drew attention to the numerous cases in which cranial and other human bones had

been found bearing evidence of having been cut or perforated by instruments belonging to the polished stone age. M. Broca, in describing the crania submitted to his notice by M. Prunières, draws attention to a similar condition in a skull sent to him by Mr. Squier, and taken by the latter from an ancient Peruvian tomb, in which a square opening had been made, evidently by a saw, and probably a few days before death; and he mentions that among the Kabyles and other African tribes trepanning is resorted to in the present day for comparatively unimportant diseases, while Hippocrates refers to the process as one established in his time among the Greeks. M. Broca does not, however, assume that cranial perforations among primitive races in Europe had any connection with surgical processes, but is rather disposed to assume them to have been the result of certain obligations of religion.—M. J. de Baye describes circumstantially the caverns and recesses, amounting to more than one hundred, which he has recently discovered and explored in the Valley de Petit-Morin, in Marne.—M. Bertrand has presented the Society with a cast of a reindeer horn, on which is distinctly traced with a flint instrument the figure of a reindeer grazing, which was found at Thaïnghen, near Lake Constance.—MM. de Quatrefages and Hamy, in offering their colleagues the second edition of their great work on “*Crania Ethica*,” which is entirely devoted to the consideration of the Cro-Magnon race, entered into an exposition of their views in regard to the relations existing between the Troglydites of Perigord and certain southern races, including not only the Basques, but Kabyle tribes from the Beni-Menasser and Djurjura regions.

SOCIETIES AND ACADEMIES

LONDON

Mathematical Society, May 13.—Prof. Cayley, F.R.S., vice-president, in the chair.—The Rev. C. Taylor read a paper on some constructions for transforming curves and surfaces. The basis of the paper was a neglected work on conic sections, “which for originality and thoroughness is in its own special department unsurpassed.” The author was G. Walker, F.R.S., of Nottingham, and his work appeared in 1794. The tediousness of the style may account for the fact that the work was not appreciated. Dr. Hirst and the Chairman made some remarks on the paper.—Mr. J. W. L. Glaisher communicated some notes on Laplace’s coefficients.—A short paper by Mr. Harry Hart, on a linkwork for describing sphero-conics and sphero-quartics, was taken as read.

Chemical Society, May 20.—Prof. Abel, F.R.S., president, in the chair.—Mr. A. H. Smee read some notes on milk in health and disease. From the results of numerous experiments he finds that when cows are fed on sewage grass alone the milk soon goes putrid, and the butter made from it is soft, and rapidly becomes rancid. He also noticed the outbreaks of typhoid which had occurred in various places owing to sewage water having been used to cleanse the dairy utensils or to reduce the quality of rich milk to the lowest standard permitted by law. A long and interesting discussion followed, after which Mr. W. H. Deering read a paper on some points in the examination of waters by the ammonia method, in which he proposes certain modifications to facilitate the application of the Nessler test and eliminate incidental errors. There was also a communication from Prof. H. Howe on some Nova Scotian Triassic Trap minerals.

Geological Society, May 12.—John Evans, V.P.R.S., president, in the chair.—The following communications were read.—Notes on the occurrence of *Eozoön canadense* at Côte St. Pierre, by Principal Dawson, F.R.S. The author commenced by describing the arrangement and nature of the deposits containing *Eozoön* at the original locality of Côte St. Pierre on the Ottawa River. The *Eozoal* limestone is a thick band between the two great belts of gneiss which here form the upper beds of the Lower Laurentian. *Eozoön* is abundant only in one bed about four feet thick; but occasional specimens and fragments occur throughout the band. The limestone contains bands and concretions of serpentine, and is traversed by veins of chrysotile; the former an original part of the deposit, the latter evidently of subsequent formation. A thin section, $5\frac{1}{2}$ inches in depth, showed: (1) Limestone with crystals of dolomite and fragments of *Eozoön*; (2) Fine-grained limestone, with granules of serpentine, casts of chamberlets of *Eozoön* and of small Foraminifera; (3) Limestone with dolomite, and containing a thin layer of

serpentine; (4) Limestone and dolomite with grains of serpentine and fragments of supplemental skeleton of *Eozoön*; (5) Crystallised dolomite, with a few fragments of *Eozoön* in the state of calcite; (6) Limestone containing serpentine, as No. 2. The author criticised some of the figures and statements put forward by Messrs. King and Rowney, and noticed two forms of *Eozoön*, which he proposed to regard as varieties, under the names of *minor* and *acervulina*. He stated that fragments of *Eozoön*, included in dolomitic limestones, have their canals filled with transparent dolomite, and sometimes in part with calcite. In one specimen a portion was entirely replaced by serpentine. The author called particular attention to the occurrence of serpentinous casts of chamberlets, single or arranged in groups, which resemble in form those of the Globigerine Foraminifera. These may belong either to separate organisms or to the acervuline layer of the *Eozoön*; the author proposes to call them *Archaeospherina*, and describes them as having the form and mode of aggregation of *Globigerina*, with the proper wall of *Eozoön*. The author discussed the extant theories as to the nature of *Eozoön*, and maintained that only that of the infiltration of the cavities of Foraminiferal structure with serpentine is admissible. He particularly referred to the resemblance of weathered masses of *Eozoön* to Stromatoporeoid corals.—Remarks upon Mr. Mallet’s theory of volcanic energy, by the Rev. O. Fisher, F.G.S. Mr. Mallet’s paper, read before the Royal Society in 1872, was discussed by the author *seriatim* as far as it seemed open to criticism. With respect to the condition of the earth’s interior, whether it be rigid or not, Sir W. Thomson’s arguments for rigidity were referred to, and geological difficulties in accepting his conclusions suggested. Mr. Mallet’s views regarding the formation of oceanic and continental areas, that they have on the whole occupied nearly the same positions on the globe at all periods from the very first, were objected to on the ground that all continental areas with which we are acquainted are formed of water-deposited rocks, and that therefore those areas must at some time have been sea-bottoms; and if these wide features have not occupied the same positions which they now do from the very first, Mr. Mallet’s explanation fails, that they were caused by unequal contraction when the crust was first permanently formed and thin. It was also shown that the theory of unequal radial contraction cannot account for the difference of elevation between continental and oceanic areas upon reasonable assumptions. For if we consider the crust to have been 400 miles thick (which cannot be considered thin), and to have cooled from 4000° F. to zero (a most extravagant supposition), then, if the crust had contracted one-tenth more beneath the oceanic area than it had done beneath the continental, we should only get a depression of one mile for the oceanic area, using Mr. Mallet’s mean coefficient of contraction. The main feature of Mr. Mallet’s theory was then discussed, viz., that “the heat, from which terrestrial volcanic energy is at present derived, is produced locally within the solid shell of our globe, by transformation of the mechanical work of compression or crushing of portions of that shell, which compressions and crushings are themselves produced by the more rapid contraction by cooling of the hotter material of the nucleus beneath that shell, and the consequent more or less free descent of the shell by gravitation, the vertical work of which is resolved into tangential pressures and motion within the shell.” Mr. Mallet’s mode of estimating the amount of heat derivable from crushing a cubic foot of rock was explained, and it was accepted as a postulate, that the heat developed by crushing one cubic foot of rock would be sufficient to fuse 0.108 of a cubic foot of rock; or, in other words, that it would require nearly the heat developable by crushing ten volumes to fuse one. Mr. Mallet considers that the heat so developed may be localised. But Mr. Fisher inquires why, since the work is distributed equally with the crushing, the heat should not be so also; and, since no cause can be assigned why one portion of the crushed portion of rock should be heated more than the rest, assumes that all which is crushed must be heated equally. In short, he is of opinion that if Mr. Mallet’s theory were true, the cubes experimented upon ought to have been themselves fused. After paying a just tribute of admiration to Mr. Mallet’s elaborate and highly important experiments upon the fusion and subsequent contraction of slags, the author remarked upon Mr. Mallet’s estimate of the probable contraction from cooling of the earth’s dimensions, showing that it had been based on untenable assumptions. (The author of the paper, however, holds that the contraction of the dimensions of the globe has been greater than mere cooling will account for.) Upon the concluding portions of Mr. Mallet’s paper, in which